SOIL TESTING SERVICES, INC.
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June 27, 1973

Land & Lakes Company, Inc.
143 North Northwest Highway
Park Ridge, Illinois 60068

Attention: Mr. James J. Cowhey STS Job No. 15009-A

Reference: Subsurface Investigation for the Proposed Sanitary Landfill, Joliet Road, north of Romeoville, Will County, Illinois

Gentlemen:

We are submitting, herewith, the results of the subsurface investigation performed at the above-referenced site.

In summary, interlayered granular soils and natural and fill clayey soils were encountered in the borings. These variable soil conditions must be taken into account in the design and operation of the proposed landfill to be constructed.

If there are any questions with regard to the information and recommendations contained in this report, or if we can be of further service to you in any way, please do not hesitate to contact us.

Very truly yours,

SOIL TESTING SERVICES, INC.

Charles W. Pfingsten

Charles W. Pfingsten, P.E.
Senior Project Engineer

Robert G. Lukas

Robert G. Lukas, P.E.
Principal Engineer

Clyde N. Baker, Jr., P.E.
Chief Engineer

CWP:es

INTRODUCTION

The subsurface investigation for the proposed sanitary landfill to be constructed south of Joliet Road, north of Romeoville, Illinois, has been completed. Nine (9) soil borings (B-1 through B-3, and B-5 through B-10) were performed at the site, and the logs of these borings, along with a boring location diagram, are included in the appendix of this report.

The ground surface elevations indicated on the boring logs are in reference to USGS datum. The depths indicated on the logs are in reference to existing ground surface at the boring locations at the time the borings were performed.

The area to be utilized initially for refuse disposal consists of a former gravel pit located on the northwest bank of the Des Plaines River Channel. The surface topography at the site could be described as highly irregular, with a relatively large deep trench near the north edge of the site and various overburden spoil piles at other locations on the site. On the south side of the site, the ground surface sloped uniformly downward toward the south. The entire existing gravel pit operation covers an L-shaped parcel; however, only the easternmost portion of the site, comprising approximately 40 acres, will be utilized initially for waste disposal. It has been proposed that some of the overburden spoil piles be used for cover and lining material where required. For this reason, some of the borings were located in spoil areas to determine the type of material present and the suitability of the materials for this use.

The purpose of this report is to describe the soil conditions encountered in the borings, to analyze and evaluate the test data, and to submit recommendations for design and operation of the proposed sanitary landfill site.

SUBSURFACE INVESTIGATION PROCEDURES

The borings were performed with a truck mounted rotary type drilling rig which employs various cutting bits and wash water to advance the bore holes. Temporary steel casing (bentonite drilling mud at the location of boring B-7) was used to maintain the bore holes open during drilling operations. All borings were extended into bedrock material, verified by either diamond core drilling or rock bitting, for a minimum of 2 ft.

Representative soil samples were obtained by means of the split-barrel and shelby tube sampling procedures in accordance with ASTM Specifications D 1586 and D 1587, respectively (see appendix). In the split-barrel sampling procedure, the number of blows of a 140 lb. hammer freely falling 30 in. on a 2 in. o.d., 1-3/8 in. i.d. split-barrel sampler was recorded; the number of blows required to advance the sampler 1 ft. into the soil after a 6 in. seating drive is termed the standard penetration resistance value. In the shelby tube sampling procedure, thin wall steel seamless tubes with sharp cutting edges were pushed hydraulically into the soil and relatively undisturbed samples obtained. All soil samples were identified, immediately sealed, and returned to our laboratory for further examination and testing.

Samples of the bedrock were obtained at borings B-8A and B-9A by the diamond core drilling procedure in accordance with ASTM Specification D 2113 (see appendix). Bedrock samples were placed in sturdy wooden containers and returned to our laboratory for further examination and classification.

In addition to the regular soil borings, observation wells, consisting of 1-1/4 in. diameter PVC (polyvinyl chloride) riser pipes and slotted wellpoint screens, were installed at a number of boring locations near the periphery of the proposed disposal site. The locations and depths to which the wells were installed are indicated on the respective boring logs. At two boring locations (B-8 and B-9), dual observation wells were installed. Both the single and dual observation wells were for the purpose of determining the slope of the phreatic surface, as well as to determine the direction of the vertical component of ground water movement. The wells were installed by placing a slotted PVC wellpoint screen and riser pipe in the bore holes. A well graded sand filter was placed around the wellpoint screen for a height of about 5 ft. above the bottom of the screen, with bentonite pellets placed above the sand backfill to ground surface to provide a seal against the inflow of surface runoff water. Where dual installations were made, a separate hole (with no soil sampling) was drilled for the second wellpoint.

The observation wells, if undamaged, may serve as a source of ground water samples for qualitative laboratory analysis as may be required before, during and after completion of landfill operations. Prior to sampling of ground water from these wells, proper operation of the wells should be verified by either flushing or withdrawal of ground water to remove any sediment.

A series of water level readings by representatives of both the proposed landfill operator and Soil Testing Services, Inc. has been made in the wells and bore holes. A tabulation of these water levels is included in the appendix of this report.

A bulk sample of the re-worked silty clay overburden was obtained from near boring B-6 at ground surface to determine grain size distribution and permeability characteristics at various degrees of compaction.

LABORATORY TESTING PROGRAM

The laboratory testing program consisted of performing water content and hand penetrometer tests upon all samples of cohesive or semi-cohesive soils recovered from the borings. In addition, water content tests were performed where granular soils were recovered above the long term ground water table level. The unit dry weight of the soil was determined where relatively undisturbed samples of cohesive or semi-cohesive soils were recovered. Where predominantly cohesionless granular soils were encountered, the standard penetration resistance values were determined in the field, and these values may be taken as an indication of the relative density of these soils in place.

In the water content test, the weight of water contained within the soil was determined and is expressed as a percentage of the oven dry weight of the soil.

In the hand penetrometer test, the unconfined compressive strength of the soil, to a maximum value of 7.0 tsf, was estimated by measuring the resistance of the soil sample to penetration of a small spring-calibrated cylinder. The unit dry weight of the soil is expressed as the ratio of the oven dry weight of the soil to the moist, in-place unit volume. The results of all the above-described laboratory tests are indicated on the respective boring logs.

A number of grain size distribution tests were performed on various typical soil samples obtained from the borings. These samples were selected to be representative of both the in-place granular soils within the disposal area and the type of material present within the spoil piles. The results of these tests are included in the appendix of this report in the form of grain size distribution curves.

The bulk sample obtained from ground surface at boring B-6 was tested for maximum laboratory density in accordance with ASTM Specification D 1557, Modified Proctor method. The results of this test indicate a maximum dry density of 123 pcf at an optimum water content of 12.3%. The natural moisture content of the clay soil was 14%, and this material was then compacted 85% to 99% at near the natural moisture content, and the coefficient of permeability, k, was determined. The results of these tests are tabulated in the appendix of this report, as well as plotted on a semi-log plot of coefficient of permeability vs. degree of compaction. In summary, the coefficient of permeability decreased with increasing degrees of compaction, as would be expected, with low to very low values resulting.

A permeability test was also performed on a relatively undisturbed portion of the sample recovered from boring B-10 between depths of 30 to 32 ft. The results of this test are indicated on the grain size distribution for this sample included in the appendix. Due to the predominantly granular nature of the soils encountered, the majority of samples were recovered with the split-barrel sampler; samples are considered to be somewhat disturbed using this technique, and permeability tests on partially disturbed samples could not be considered as representative.

In conjunction with the laboratory testing program, soil samples were examined in the laboratory and classified on the basis of texture and plasticity in accordance with the Unified Soil Classification system. The soil descriptions on the boring logs are in conformance with this system, and the estimated group symbol according to this system of classification is included in parentheses following the soil descriptions on the boring logs. A brief explanation of the Unified system is included in the appendix of this report.

Soil samples will be retained at the laboratories of Soil Testing Services, Inc. for a period of 60 days, after which they will be discarded unless instructions as to their disposition are received.

SITE CONDITIONS

The site of the proposed landfill had been utilized as a source of sand and gravel. The ground surface is highly irregular where the pit operations had taken place. In general, the southernmost portion of the site appeared to exist in its natural condition of a low flood plain area; however, the central and northern portions consisted of a relatively deep excavation generally parallel to the north property line from which sand and gravel had been excavated. Elongated spoil piles ran parallel to the excavation through the central portion. Drainage from the deepest portion was through a ditch extending across the spoil pile area toward the south. Other irregular spoil piles were located near the northwest corner. Occasional low areas were noted to contain standing water. The ground surface to the north of the site appeared to slope downward rather gently toward the south and east. Thus, surface drainage from the north of the site is directed toward the north edge and northeast corner of the proposed sanitary landfill area.

The ground surface in the general vicinity slopes downward toward the southeast. The Des Plaines River Channel is located approximately 1/4 mile southeast of the site.

A portion of the 7.5 minute USGS Topographic map of the area, with the site indicated, is included in the appendix of this report. Ground surface contours indicated on this map are based upon field reconnaissance during 1952 to 1954, and it is apparent that the sand and gravel pit operations had just started at that time. Existing topography is significantly different; it has been determined from ground control and aerial photographs, and is reported by others.

A residence was situated immediately to the west of the proposed site.

SOIL CONDITIONS

The specific soil conditions encountered at the boring locations are indicated on the respective boring logs. In summary, borings B-1A, B-5, B-6, B-7 and B-10 were performed in waste or overburden materials, while borings B-2, B-3, B-8 and B-9 were performed where natural soils were encountered immediately underlying the ground surface. In borings performed in the overburden waste materials, predominantly clayey soil, containing lesser portions of silt, sand and gravel, were encountered at ground surface and extended to depths varying from a minimum of approximately 12 to 13 ft. at borings B-5, B-6 and B-7, and to a depth of approximately 33 ft. at boring B-1A. At the location of borings B-1A, B-6 and B-7, the surface fill material was underlain by predominantly granular soils variously described as fine to medium sand, fine to medium gravel, and fine to coarse sand. These granular soils contained minor portions of silt and clay and extended to depths varying from a maximum of 58 ft. at boring B-1A, and to a minimum of 31.5 ft. at boring B-6. At B-7, natural topsoil and moderately plastic (CL-CH) silty clay underlay the surface fill and above the granular soils. At boring B-7, the granular soils extended to the surface of bedrock encountered at a depth of 44.5 ft. Underlying the surface fill material at the location of boring B-5, predominantly cohesive silty clay was encountered to a depth of 30 ft., where alternating layers of silt and fine sand were encountered. This material appeared to change gradually to silty and clayey fine to coarse sand which extended to a depth of 44 ft., where bedrock was encountered. At borings B-1A and B-6, gray silty clay was encountered beneath the granular soils and immediately overlying the limestone bedrock material at depths varying from 43 to 58 ft.

Soil conditions at the location of boring B-10 were similar to those encountered at boring B-5, performed approximately 300 ft. west of boring B-10.

Boring B-2 was performed in an undisturbed area near the northeast corner of the site. In this boring, predominantly cohesive soils were encountered to a depth of 13 ft., where a transition to predominantly granular sandy and gravelly soils was found. These granular soils were encountered in a very dense condition, generally, and extended to the depth of 54 ft. where gray silty clay was encountered and which extended to the depth of 61.5 ft. At this depth, limestone bedrock was encountered.

Borirg B-3 was performed at the base of the excavation resulting from removal of sand and gravel. At this location, predominantly granular soils, consisting of sand and gravel, were encountered between ground surface and 15 ft. At this depth, a thin layer of silty and sandy hard clay was encountered to a depth of 18 ft. Sand, silt and gravel were encountered at this depth and extended to the surface of limestone bedrock at 20 ft.

Borings B-8 and B-9 were performed near the south edge of the site in areas which appeared to have remained relatively undisturbed by the sand and gravel pit operations. A thin layer of crushed limestone fill was encountered at ground surface at boring B-8. Immediately underlying this fill material and the ground surface at boring B-9, organic soils, variously described as peat, organic clay, and organic silt, were encountered. The peat extended to a depth of 12.5 ft. at boring B-8 immediately overlying the limestone bedrock. However, at the location of boring B-9, silty, sandy and gravelly clay was encountered at 3 ft. and extended to a depth of 12 ft., where silt and sand with broken rock was encountered. The surface of weathered limestone bedrock was encountered at a depth of 15 ft. and continued to a depth of 19.5 ft. where solid limestone was encountered.

The position of the stratification lines on the boring logs are, in some cases, estimated; in situ, the change between soil types may be gradual.

GROUND WATER TABLE CONDITIONS

Water level readings were obtained during and immediately after completion of the boring operations. In addition, subsequent readings have been made at extended intervals following completion of the boring operations. These subsequent readings are indicated on the tabulation included in the appendix of this report. In addition to these readings, water surface elevations at isolated ponded water areas have been obtained. Based on all water level observations, surface contours of the long term hydrostatic ground water table can be estimated. The highest long term water level appears near the northwest corner of the proposed refuse disposal area at an elevation slightly greater than 625. The lowest piezometric surface was at the location of boring B-9, where the water table was at an elevation of approximately 592. Thus, it is apparent that the ground water table slopes downward on the order of 33 ft. across the site from northwest to southeast. The double wellpoint observation well at the location of boring B-9 very definitely indicates that ground water discharge is occurring in this area. The dual wellpoint wells at boring B-8 indicate approximately the same ground water table elevation; thus, the readings in this area appear to be inconclusive, as far as the vertical component of ground water flow is concerned.

Based upon all available ground water table information, movement of ground water from northwest to southeast can be anticipated. Where relatively clean granular soils were encountered, the water table level occurred within these granular layers. Considerable ground water movement could be expected, due to the more permeable nature of the granular soils and the relatively large difference in ground water head across the site.

The development of shallow perched water table conditions appears to be possible in areas of higher elevation. The most likely areas for this to occur would be where relatively low permeability silty clay soils were encountered near existing ground surface, or immediately underlying a more permeable layer, such as sand or gravel. A perched water table condition may develop where infiltration of precipitation or runoff water is retarded by an underlying low permeability layer, such as silty clay.

Some fluctuations in the level of the long term hydrostatic ground water table should be anticipated throughout the years, depending upon variations in precipitation, evaporation and surface runoff.

SITE DEVELOPMENT - GENERAL COMMENTS

It is anticipated that the entire approximately 40-acre site will be utilized for refuse disposal. The waste material placed will most probably consist of domestic, industrial and landscaping waste, as well as building rubble. It is not known whether hazardous waste materials, sludge, or chemical waste will be placed within the landfill. The site will be filled such that final ground surface will be rather uniform, sloping downward from the north edge to the south, meeting existing grades on the perimeter of the site. Thus, it is anticipated that the maximum thickness of waste material placed will be on the order of 55 ft. (in the relatively deep trench from which sand and gravel has been removed). The sequence of filling will probably be such that the waste material will be placed first in the existing excavation, and the various piles of spoil materials around the site will be utilized for both cover and lining where necessary. The waste disposal process will be carried out in such a manner that, as the material from higher topographic areas is utilized for lining and cover purposes, the resulting excavations will be refilled with refuse. Final use of the site after completion of the landfilling has not yet been determined.

It is anticipated that a leachate collection system will be included in the project, and it is possible that rapid stabilization of the landfill by recirculation of leachate through the refuse may be utilized. If rapid stabilization is not employed, it is anticipated that the leachate will be directed to an on-site treatment plant.

With regard to filling operations, it is recommended that refuse not be placed to depths greater than the maximum upper range of the long term hydrostatic ground water table level fluctuation. Available information appears to be sufficient to determine the position of the long term hydrostatic ground water table level throughout the site. However, based on results of the borings, soil conditions appear to be much more variable from place to place. Extensive deposits of relatively permeable granular soils were encountered underlying surficial clays and overlying the bedrock. At some boring locations, the upper zone of bedrock was also noted to be rather broken or weathered; this type of bedrock may also be relatively permeable.

To minimize the possibility of loss of leachate into these more permeable zones where the leachate flow can then enter the ground water system, it is recommended that the landfill be provided with a low permeability underliner. The most economical underliner would probably consist of site silty clay overburden material stockpiled at various locations. It is recommended that this lining material have a minimum thickness of 3 ft., measured perpendicular to the sides of the refuse disposal area. Care should be exercised when placing the liner material to be sure that no more permeable zones of sand and gravel are built into the liner. Where such soils are encountered in the stockpile (borrow) area, it is recommended that they be set aside and utilized at a later time for intermediate cover material. Based on results of compaction and permeability tests on the sample from boring B-6, it is recommended that the lining material be compacted to a minimum of 90% of the maximum density obtained in accordance with ASTM Specification D 1557, Modified Proctor method, to provide a low permeability lining. This material should be placed in lifts not exceeding 9 in. in loose thickness, and each lift compacted to the above-recommended density. Where the lining material becomes softened or loosened due to weather or traffic, it is recommended that the loosened or softened zones be replaced with properly compacted fill so that the recommended thickness of lining material is actually in place at all locations. Construction of the underliner is extremely important; if one or more windows were to be built into the lining, such that leachate could escape through these windows, they would negate the function of the entire underliner. The continuity of the underliner is of greatest importance in construction and operation of the landfill.

The southern extent of the landfill area may be limited by the fact that the long term hydrostatic ground water table is located relatively close to existing ground surface in this area. Also, relatively compressible organic soils, such as peat and organic clay, were encountered. Any lining material placed over the top of existing organic soils would be difficult to compact on a spongy, compressible subgrade, and would tend to settle under the weight of the lining material and refuse and cover material placed above it. It is possible that the long term water table level could be lowered in these areas somewhat by trenching or installation of drain tile lines. Other methods of draining the area, such as pumping, are not suggested, since the drainage system would have to permanently lower the water table.

We have reviewed the flood plain maps prepared in cooperation with the Northeastern Illinois Metropolitan Area Planning Commission; these maps do not indicate that any flooding has ever been recorded within the proposed landfill area.

If it is considered desirable and economically justified to carry out sanitary landfill operations in the lower southern portion of the site, it is recommended that the ground water table be permanently lowered below the anticipated base of refuse deposition by appropriate methods.

It is also recommended that the existing surficial organic soils be removed down to the surface of approved, undisturbed inorganic natural soils suitable for support of the underliner, refuse and cover material. Placement of the underliner in these areas should be in accordance with the above-noted recommendations. The organic soils removed from these areas could be stockpiled and used on the upper surface of the final cover material to establish vegetation.

In installation of the underliner, the natural flow of the long term ground water table should not be impeded. For this reason, it may be necessary to install a drainage system beneath the underliner in some areas to allow the natural ground water flow to occur without obstruction. The sub-underliner drainage system may consist of either a series of drain pipes or tiles, a permeable underdrain layer, or trenches filled with a free draining granular soil.

The trenches would be the least desirable underdrain method, since fine grained soils may wash into the permeable granular soil zones, causing the drains to block. Possibly, the sub-underliner drainage system could be utilized to lower the ground water table in the southern portion of the site. Some difficulties may be encountered in the installation of drain pipes or tiles below the ground water table where these are installed in cohesionless, granular soils. These soils will probably tend to flow into the drain line excavations along with significant quantities of seepage water. To install the drain lines in these areas, it may be necessary to temporarily dewater the areas by a series of shallow sump pits and pumps.

It is anticipated that the landfill will be provided with a leachate collection system placed on top of the underliner. As previously described, the leachate may be either treated at the site and released, or it may be re-circulated through the refuse to accelerate decomposition of the waste material. The underdrain system may consist of either a series of drain tile lines, a free draining granular soil layer, or a combination of the two. Since relatively clean granular soils may be available at the site, it may be most economical to utilize this material in the underdrain system. It is suggested that, if on-site granular soils are used for this purpose, they be a well graded material and have no more than 6% by weight passing the #200 sieve. The underdrain system should be properly sloped to one or more collection points. If a drain pipe or tile system is used, it is recommended that the pipe material be resistant to deterioration which might occur in the environment in which this piping material is placed. To minimize the possibility of damage to the piping underdrain system which may occur under vehicular traffic on the underliner, it may be beneficial to locate the drain pipes or tiles in shallow trenches. Where the underdrain pipes are located in trenches, it is recommended that the underliner be thickened in these areas such that a minimum of 3 ft. of natural or compacted low permeability silty clay is in place below the drains and throughout areas where refuse will be placed. The leachate collection system should be planned so that proper grades for drainage by gravity are provided.

The preparation of excavations to receive refuse, i.e., placement of underliner material and drainage systems, may encounter natural low permeability silty clay, as was encountered at boring B-10. Based on the results of the permeability tests performed on an undisturbed portion of the sample obtained from a depth of 30 ft. at this boring, the natural permeability of this soil is very low, and it would not be necessary to overexcavate or replace this natural clay material. However, further investigation may be required in these areas to assure that the thickness of low permeability material, where encountered in a natural condition, is sufficient.

Use of the stockpiled silty clay overburden material at boring B-1A may encounter or damage the wellpoint observation well. Where this well is intercepted during construction or waste disposal operations, it should be properly sealed or grouted to prevent loss of leachate from the containment area. It may be necessary to replace the observation well with an additional well outside the area where refuse will be disposed of.

Each day's deposit of refuse should be covered by a minimum of 6 to 8 in. of compacted inorganic soil. If it is considered desirable to minimize the quantity of leachate developed within the landfill, it is suggested that silty clay cohesive soils be used for daily cover. Daily cover could also be comprised of sandy and gravelly soils which would allow a greater portion of precipitation to infiltrate the refuse. A greater amount of infiltration would not appear to be of great consequence if site development includes re-circulation of leachate to accomplish rapid stabilization. Use of more permeable granular soils as intermediate cover also has the advantage that venting of gases developed by decomposition more readily occurs through these permeable layers.

Upon achieving final grade in a particular area of the proposed landfill, it is recommended that a minimum of 2 ft. of well compacted inorganic soil be placed over the refuse to provide a final cover. Lesser infiltration rates would be anticipated if the cover material were of low permeability silty clay soil. This final cover should be properly sloped so that drainage away from the refuse disposal area is provided. An additional layer of topsoil, or the organic soils removed from the lower portions of the site, may be advantageous in establishing vegetation on the cover which could be expected to minimize erosion of the cover material. In any event, where erosion of the cover does occur, or where settlement of the cover material due to decomposition or densification of the refuse results in areas of standing water, prompt maintenance of the cover should be provided. The actual design of the final cover configuration will depend upon whether or not rapid stabilization techniques are utilized; the method used to reintroduce the leachate into the upper surface of the refuse will have to be considered in the final cover design.

The refuse should be placed to as dense a state as possible. The quantity of refuse is, thus, maximized, and subsequent subsidence of the area due to decomposition of refuse would be minimized.

Since the ground surface in the area to the north of the site slopes downward toward the site, some surface runoff toward the site could be expected, especially during wetter seasons of the year. It is recommended that this surface runoff flow be intercepted by a drain line or ditch located along the periphery of the site where surface runoff could be expected to be directed toward the site. All runoff water which has not come into contact with the refuse should be promptly directed away from the area in which refuse is disposed of.

The final design fill side slopes for the site have not yet been determined. It is anticipated that the slope will be rather gradual from existing ground surface on the south edge upward toward the existing ground surface on the north edge of the site. However, to maximize the quantity of refuse placed, final slopes may relatively steep. It is recommended that, after information on final design side slopes becomes available, review of final grades be made to evaluate the stability of final slopes and the feasibility of the proposed final grade contours.

It is suggested that site preparation work, including stripping, placement and compaction of underliner fill, where necessary, and installation of the under-drain system be inspected and tested by an experienced soil engineer to assure proper conformance with project requirements. If you wish, we would be pleased to be of further service to you in providing any of these services during site preparation work.

The reason for locating the bottom of the underliner material at a level above the long term ground water table level is to minimize the possibility of uplift on the bottom of the underliner in the event of a temporary rise in the water table level and to minimize construction problems where construction of the under-liner would take place below the water table level.

It is recommended that the quality of ground water, leachate and site effluent be monitored on a regular basis to determine the necessity and magnitude of leachate treatment required. Since the site lies in a groundwater discharge area and available information is sufficient to know relatively well the direction of ground water movement, the number of monitoring points would not have to be large. Monitoring points would include outlets for the leachate drain lines, the observation wells, as well as surface drainage outlets. This water quality monitoring program should be started prior to commencement of filling operations so that initial readings can provide a basis for future comparison. There may be a significant length of time during initial stages of land fill where little or no leachate is developed. This would be expected where the field capacity of the waste materials is relatively high, as could be expected in waste containing a high percentage of paper.

Generation of gases within the landfill will occur as decomposition of refuse takes place. A venting system should be provided to allow escape of this gas without lateral migration from the site. Lateral migration of gas to upland areas north of the site could have serious consequences, especially if this area is developed.

Regarding the lined excavation to be filled with refuse, it should be expected that some problems may occur due to accumulation of seepage or runoff water at the base of the excavation. All such water which has not come into contact with the refuse should be promptly diverted from the area. It should be possible to do this by appropriate ditching, sloping, or by sump pit and pump procedures. The on-site silty clay material may be difficult to work with during wet or cold seasons, and proper equipment should be available at all times so that the cover material can be promptly placed.

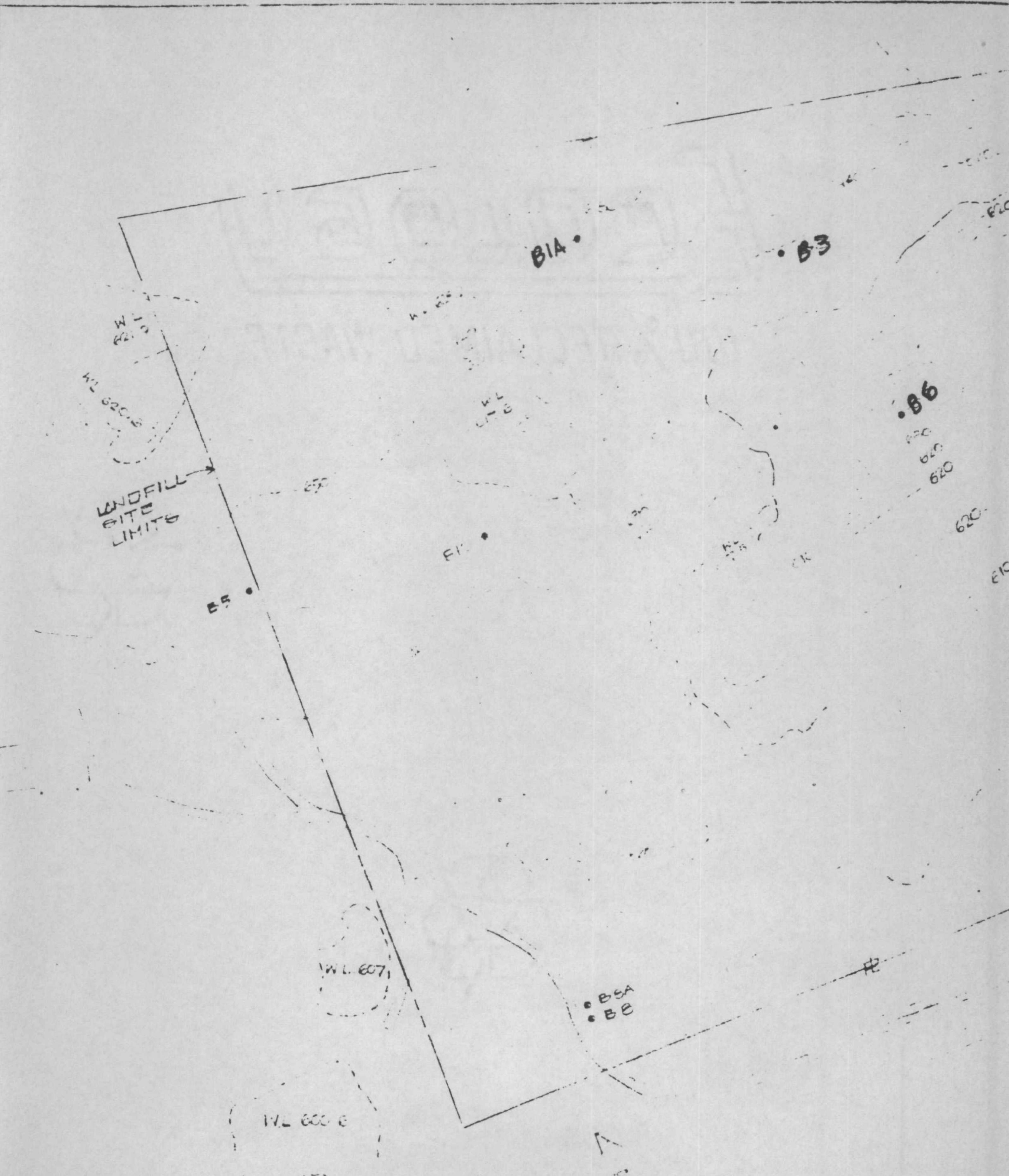
The silty clay fill material encountered in the overburden soil piles was generally encountered at moisture contents relatively close to optimum, as determined from laboratory compaction tests. Thus, it would not be expected that significant difficulties would be incurred in compacting this material for lining to the recommended degree. However, there may be some pockets of wetter material which would be difficult to compact; it is suggested that the wet materials, where encountered, either be set aside or properly aerated to reduce the moisture content to a degree where proper compaction can be obtained.

GENERAL QUALIFICATIONS

The analysis and recommendations contained in this report are based upon the results of nine (9) soil borings performed at the site, the results of laboratory tests, and on information available regarding the scope of the project. Although generalizations have been made herein regarding soil conditions at the site, the specific information reported is valid only at the location of the soil borings, and variations may occur at intermediate locations. The nature and extent of these variations may not become evident until operation of the land fill is in progress. If significant variations then appear evident, it would be necessary for a re-evaluation of recommendations contained in this report.

We would be pleased to review the plans and specifications for the proposed project after they have been prepared so that we might have the opportunity to comment on the effect of soil conditions on the design and specifications.

This report has been prepared to aid the engineer in the evaluation of this site and to assist in the design and operation of this project. The scope is limited to the specific project and location described herein and represents our understanding of significant aspects relevant to soil and refuse disposal considerations. If there are differences in the location and/or design features of the project, including elevations, as we understand them and as described herein, compared with final locations, elevations and design criteria, we should be informed so that we may have the opportunity to revise our conclusions and recommendations where appropriate. If additional soil borings are deemed necessary, as would be the case if additional area is to be incorporated into the disposal area, or if additional laboratory testing is found necessary, we would be pleased to be of further assistance to you in providing any of these services.


B1A
B3
B6
620
620
620
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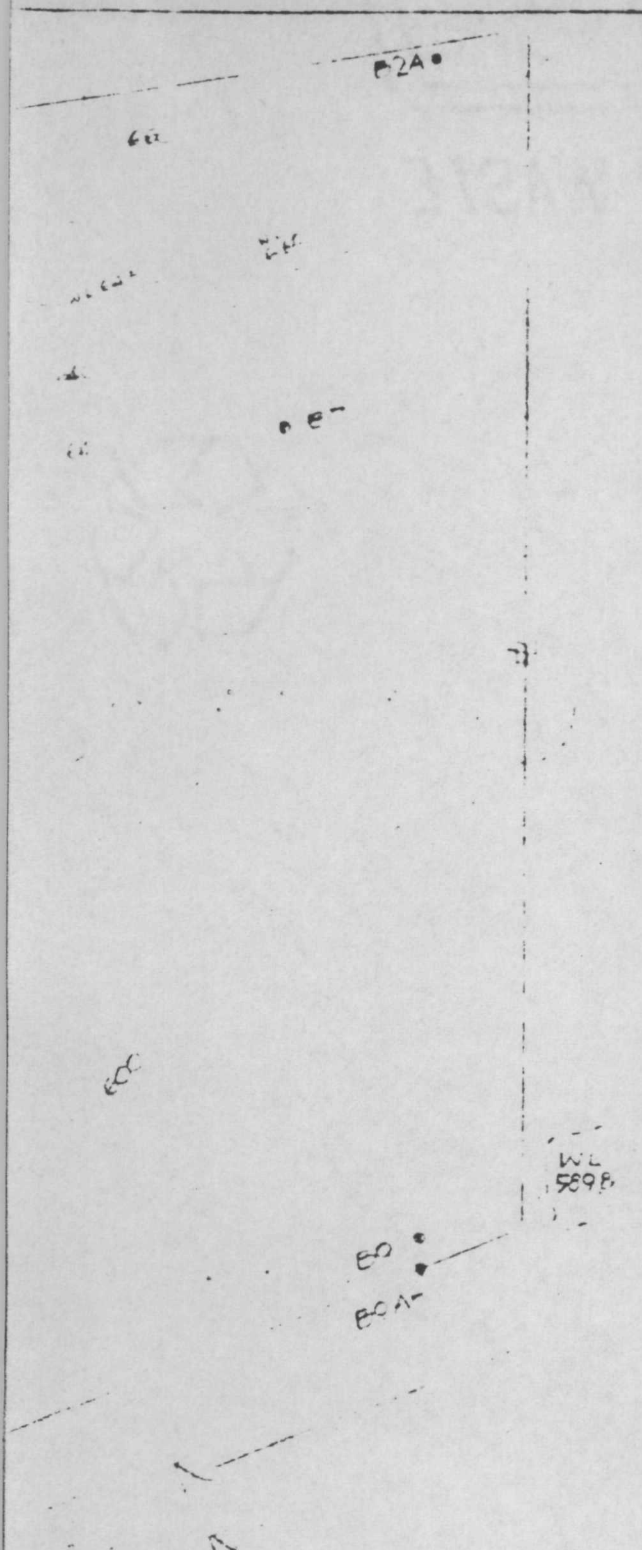
610
W.L.
W.L. 620.6
W.L.
LANDFILL SITE LIMITS
B5
W.L. 607
B8A
B8
W.L. 600.6

APPENDIX

1. Location Diagram
2. Topographic Map
3. General Notes
4. Boring Logs (B-1A through B-10, except B-4)
5. Grain Size Analysis (8)
6. Tabulation - Ground Water Level Observations
7. Laboratory Compaction Report - Proctor Curve
8. Permeability Test Results Table
9. Compaction vs. Permeability Curve
10. ASTM Specifications

    D 1586-67
    D 1587-67
    D 2113-70

11. Unified Soil Classification System
12. Soil Characteristics Pertinent to Roads and Airfields



SCALE 1" = 150'

NOTE

BORING LOCATIONS ... SCALE
ARE APPROXIMATE

SOIL BORING LOCATION DIAGRA
PROPOSED SANITARY LANDFILL SIT
JOLIET ROAD NORTH OF ROMEOVILL
WILL COUNTY ILLINOIS

SOIL TESTING SERVICES, IN
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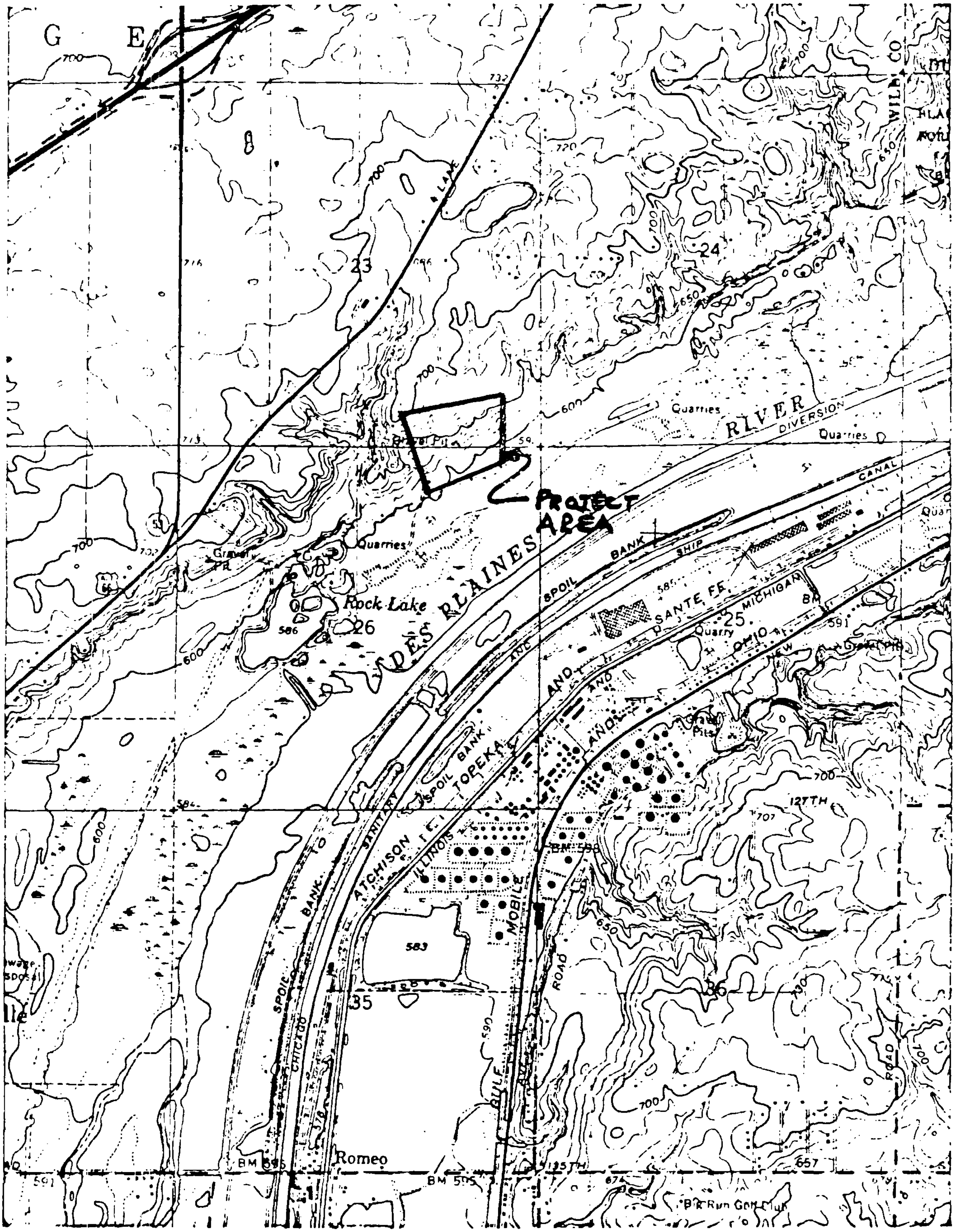

TOPOGRAPHIC MAP OF THE AREA

CONTOUR INTERVAL = 10 FT.

SCALE: 1" = 2,000'

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SOIL TESTING SERVICES, INC.
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NORTHBROOK ILLINOIS

15009A

GENERAL NOTES

1950 Chicago Building Code Soil Classifications are Used Except Where Noted

DRILLING & SAMPLING SYMBOLS

SS : Split-Spoon – 1⅜" I.D., 2" O.D., except where noted
ST : Shelby Tube – 2" O.D., except where noted
PA : Power Auger Sample
DB : Diamond Bit – NX: BX: AX:
CB : Carboloy Bit – NX: BX: AX:
OS : Osterberg Sampler – 3" Shelby Tube
HS : Housel Sampler
WS : Wash Sample
FT : Fish Tail
RB : Rock Bit
WO : Wash Out

Standard "N" Penetration: **Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch OD split spoon, except where noted.**

WATER LEVEL MEASUREMENT SYMBOLS

WL : Water Level
WCI : Wet Cave In
DCI : Dry Cave In
WS : While Sampling
WD : While Drilling
BCR : Before Casing Removal
ACR : After Casing Removal
AB : After Boring

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days observation, and additional evidence on ground water elevations must be sought.

CLASSIFICATION

COHESIONLESS SOILS

"Trace"	:	1% to 10%	
"Trace to some"	:	10% to 20%	
"Some"	:	20% to 35%	
"And"	:	35% to 50%	
Loose	:	0 to 9 Blows	or equivalent
Medium Dense	:	10 to 29 Blows	
Dense	:	30 to 59 Blows	
Very Dense	:	≥ 60 Blows	

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, then clay becomes the principle noun with the other major soil constituent as modifier; i.e., silty clay. Other minor soil constituents may be added according to classification breakdown for cohesionless soils; i.e., silty clay, trace to some sand, trace gravel.

Soft	:	0.00 — 0.59 tons/ft²
Stiff	:	0.60 — 0.99 tons/ft²
Tough	:	1.00 — 1.99 tons/ft²
Very tough	:	2.00 — 3.99 tons/ft²
Hard	:	≥ 4.00 tons/ft²

GENERAL NOTES

STS

SOIL TESTING SERVICES, INC.
111 PFINGSTEN ROAD
NORTHBROOK ILLINOIS

THANK YOU very much for coming and showing your concerns regarding our environment. Your appearance is very important. Again, thank you for coming.

After Mrs. Akin has finished her questions, there will be time for questions from the audience. Please bear with us while the IEPA (Illinois Environmental Protection Agency) is being questioned.

HISTORY OF LAND AND LAKES LANDFILL

DATES:

Prior to 1976	Land and Lakes requested permit for Landfill. It was opposed by residents business men, municipalities and local politicans.
May, 1976	IEPA ordered to issue permit
1982	Romeoville Village Board found PCB content in landfill to be increasing from 17.0 to 22.1 to 26.00 (50 parts be million is TOXIC). Romeoville Village Board is concerned about find. An auger boring is done approximate 18 inches deep. Citizens For A Cleaner Environment (CCE) is dissatisfied with method of sample because by LAW the Land & lakes landfill has to put 6 inches of clean fill every night. --18 inches is too shallow a test.
January 23, 1984	CCE is chartered
August 23, 1984	CCE's first meeting with Mr. Bill Child, Deputy Land Manager, IPEA and Mr. Beechley, Maywood IPEA office. They express that CCE's concerns are valid and the IEPA will do deep core borings at Land & Lakes.
November 19, 1984	Meeting in Maywood, Il., IPEA, Land & Lakes, & CCE members present. Surve requested from residents of Bluff Road, Joliet Road & Davey Road. Surveys prepared by the IEPA and Land and Lakes.
Jan of '85	Meeting with concerned citizens of Bluff, Joliet & Davey Road and Mr. Chil Surveys formally requested of residents.
June 16, 1985	Surveys completed and returned to the IEPA with promise from the IEPA that a series of deep core borings would be done upon receipt of the surveys.
August of '85	IEPA not drilling becuase of legal department determination. Compromise reached and numerous monitoring wells to be installed.
Sept of '85	No monitoring wells installed, but one well to monitor Bluff Road water only is promised. This well will monitor water only when the Des Plaines River overflows cuasing reversal in waterflow. Nothing done to monitor Romeoville's water.
October 1, 1985	Meeting requested to explain reasons for the IEPA's decisions.

T H A N K   Y O U   F O R   C O M I N G

Y O U R   S U P P O R T   I S   V I T A L